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# FLOOD INSURANCE STUDY

## RICHMOND COUNTY, NORTH CAROLINA AND INCORPORATED AREAS

| COMMUNITY NAME | COMMUNITY NUMBER |
|---|---|
| HAMLET, CITY OF | 370200 |
| ROCKINGHAM, CITY OF | 370201 |
| UNINCORPORATED AREAS | 370348 |

SEPTEMBER 6, 1989

Federal Emergency Management Agency

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY

RICHMOND COUNTY, NORTH CAROLINA
AND INCORPORATED AREAS

## 1.0 INTRODUCTION

### 1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the geographic area of Richmond County, North Carolina, including the City of Hamlet, the City of Rockingham, and the Unincorporated Areas of Richmond County (hereinafter referred to collectively as Richmond County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

This Flood Insurance Study revises and supersedes a previous Flood Insurance Rate Map for the City of Hamlet, North Carolina (Reference 1). This information will be used by the communities to update existing floodplain regulations as part of the regular phase of the National Flood Insurance Program. The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

### 1.2 Authority and Acknowledgments

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers (COE), Wilmington District, (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-86-E-2262, Project Order No. 7. This study was completed in June 1987.

### 1.3 Coordination

On October 11, 1985, an initial coordination meeting was held in the Rockingham Municipal Building with representatives of the City of Rockingham, Richmond County, FEMA, and the Study Contractor. At the meeting, the nature and purpose of the Flood Insurance Study were explained, streams to be studied were identified, and the limits of the study area were established. The methodology to be used in this study and floodway information were also discussed. An announcement of the

initiation of the study and a request for flooding information were published in local newspapers at the outset of the study.

On October 20, 1988, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

## 2.0 AREA STUDIED

### 2.1 Scope of Study

This Flood Insurance Study covers the geographic area of Richmond County, North Carolina. The area of study is shown on the Vicinity Map (Figure 1).

Flooding caused by overflow of Hitchcock Creek, Falling Creek, North Prong Falling Creek, and South Prong Falling Creek was studied in detail.

Approximate analyses were used to study those areas having low development potential or minimal flood hazards. Approximate flooding within the City of Hamlet previously studied using approximate analyses was shown on the Flood Insurance Rate Map for the City of Hamlet (Reference 1) and is incorporated into this Flood Insurance Study.

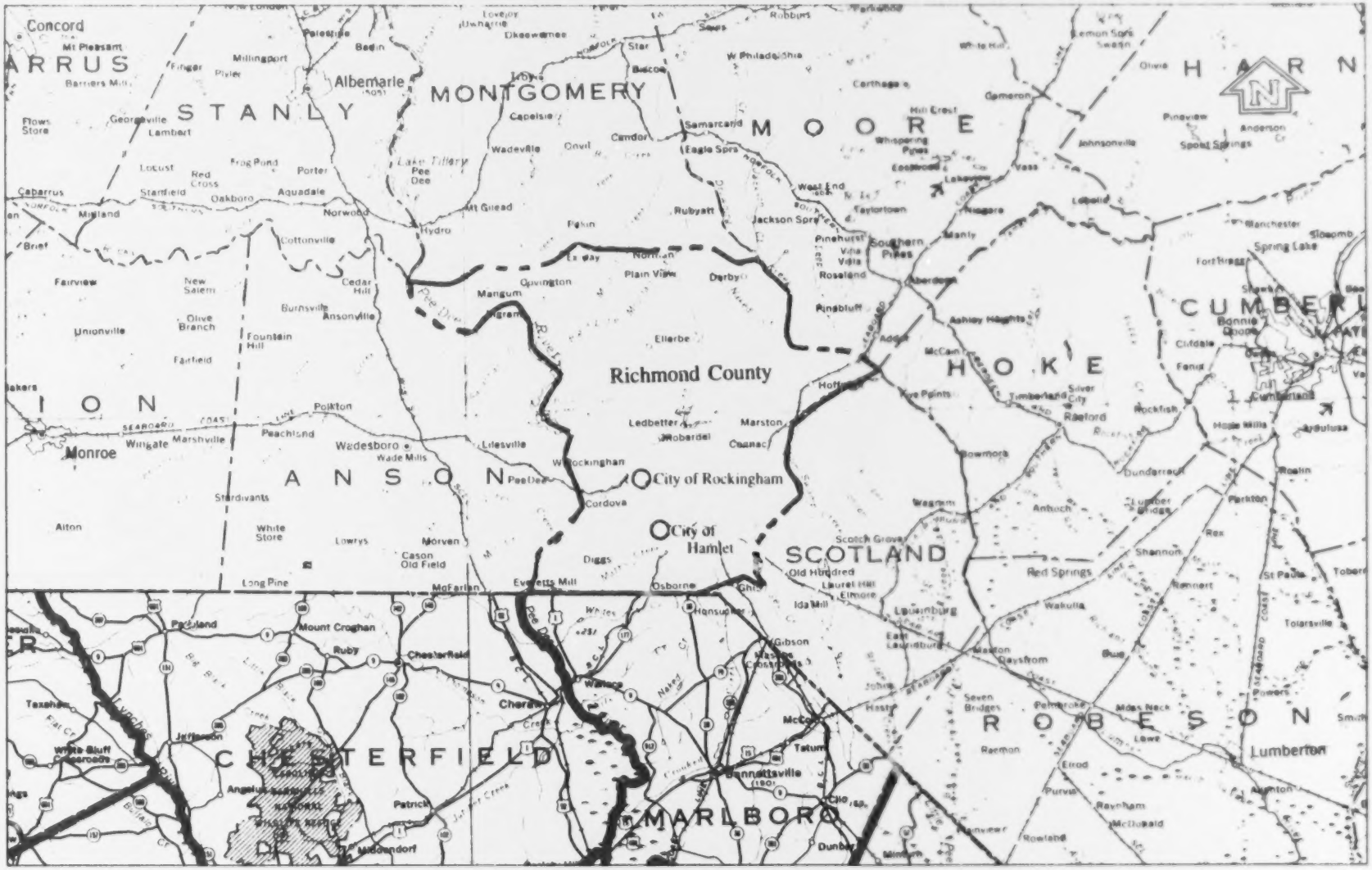
The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through June 1992. The scope and methods of study were proposed to and agreed upon by FEMA and Richmond County.

### 2.2 Community Description

Richmond County is in the Piedmont region of south-central North Carolina, along the border of South Carolina, about 65 miles east of the City of Charlotte, North Carolina. The county is bordered on the west by Anson County, North Carolina; on the northwest by Stanly County, North Carolina; on the north by Montgomery County, North Carolina; on the northeast by Moore County, North Carolina; on the east by Scotland County, North Carolina; and on the south by Marlboro County, South Carolina. The City of Rockingham, in south-central Richmond County, is the county seat. The county is served by U.S. Routes 1, 74, and 220 and the CSX railroad. The 1980 population of Richmond County was reported to be 45,481 (Reference 2).

Richmond County is generally rural, with most of its industry in and around the Cities of Rockingham and Hamlet.

Richmond County borders the Pee Dee River on the west and Drowning Creek on the northeast. The topography of the county is typical of the Piedmont region, hilly with moderate to steep slopes. Elevations vary from 90 feet National Geodetic Vertical Datum of 1929 (NGVD) in the Pee Dee River floodplain to 600 feet NGVD in the northeastern part of the county.


Concord
Albemarle
MONTGOMERY
STANLY
MOORE
HARNETT
Richmond County
ANSON
City of Rockingham
City of Hamlet
SCOTLAND
HOKE
CUMBERLAND
ROBESON
CHESTERFIELD
MARLBORO
Monroe
Wadesboro
Lilesville
Peachland
Polkton
Marshville
Wingate
Ansonville
Cedar Hill
Burnsville
Fairview
Unionville
Olive Branch
Fountain Hill
Fairfield
New Salem
Cottonville
Norwood
Mt Gilead
Ellerbe
Rockingham
Cordova
Osborne
Ida Mill
Laurinburg
Red Springs
Raeford
Fayetteville
Lumberton
Pembroke
Maxton
Rowland
Dunbar
Bennettsville
Cheraw
Chesterfield
Mount Croghan
Ruby
Jefferson
Patrick
McFarlan
Long Pine
Lowrys
Morven
Cason
Old Field
White Store
Alton
Sturdivants
Wade Mills
Marston
Ledbetter
Robardel
Cognac
Pee Dee
Lake Tillery
Badin
Palestine
Millingport
Barriners Mill
Georgeville
Lambert
Flows Store
Locust
Red Cross
Frog Pond
Porter
Oakboro
Aquadale
Stanfield
Caparrus
Midland
Brief
Mangum
Covington
Norman
Plain View
Derby
Pinebluff
Roseland
Aberdeen
Southern Pines
Pinehurst
Vass
Whispering Pines
Cameron
Carthage
Samarcand
Eagle Spgs
Candor
Wadeville
Covil
Capelsie
Star
Biscoe
Robbins
Seven Springs
Olivia
Pineview
Johnsonville
Spout Springs
Anderson
Manchester
Sloansb
Spring Lake
Fort Bragg
Bonnie Doone
Cliffdale
Fenix
Cumberland
Rockfish
Hope Mills
Ardulussa
Roslin
Parkton
Rex
Shannon
Rennert
St Pauls
Tolarsville
Maxton
Red Springs
Laurel Hill
Elmore
Old Hundred
Scotch Grove
Anbuch
Wagram
Dundarrach
Bowmore
Rockingham
Pee Dee
Evergetts Mill
Diggs
Hasty
Seven Bridges
Raemon
Errod
Purvis
Raynham
McEubald
Lumberton
Smith
Powers
Tolarsville
Gibson
Wagram
Gaysfrom
Wakulla
Ghio
Hasty
Tatum
McColl
Jefferson
Taxahaw
Angelus
Wire Bluff
Crossroads
Middendorf
Dunbar
Rowland
Mineral
Hanover
Ruby
Chesterfield
Mount Croghan
Pageland
Lynches
Little Pee Dee
Natural Creek
Whites
Hensdale
Wallace
Gibson
Maxton
Red Springs
Laurinburg
Wakulla
Ida Mill
Osborne
Evergetts Mill
McFarlan
Long Pine
Lowrys
Morven
Cason
Old Field
White Store
Alton
Sturdivants
Wade Mills
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Seven Bridges
Raemon
Errod
Purvis
Raynham
McEubald
Lumberton
Pembroke
Maxton
Rowland
Dunbar
Bennettsville
Cheraw

Principal soils are of the Wakulla-Candor-Ailey and Tatum-Badin-Golston Associations, which are nearly level to sloping, moderately well- to poorly-drained soils. However, the floodplain soils are of the Tawcaw-Chastain, McQueen-Dogue-Chewacla, and Johnson Associations, which are nearly level, poorly-drained soils (Reference 3).

The climate in Richmond County is mild, with an average temperature of 62 degrees Fahrenheit and an average annual precipitation of 48 inches (Reference 4).

The floodplains of the streams studied in detail are mostly undeveloped except for structures recently built on the fringes of the 100-year floodplain.

### 2.3 Principal Flood Problems

Significant flooding occurred along the Pee Dee River in 1908, 1928, 1936, and 1945. Of those events, the 1908 and the 1945 floods produced the highest crests in Richmond County (within 0.5 foot of each other) at an elevation of about 151.7 feet NGVD at the U.S. Geological Survey (USGS) gage station at U.S. Route 74 (Reference 5). There is no record of any significant damage along the Pee Dee River, mainly due to the lack of development within the floodplain. Flooding has occurred on other streams in the county, but there was not adequate documentation to determine the extent of damage.

In July 1984, several businesses along North Prong Falling Creek and South Prong Falling Creek were flooded, and there have been claims that a flood in 1969 or 1970 reached higher stages than the 1984 flood.

### 2.4 Flood Protection Measures

There are several dams in Richmond County that were built to supply water or for recreational purposes. There are also several hydropower dams on the Pee Dee River that affect the stages on the river in Richmond County. None of those facilities provide any protection from a major event such as the 100-year flood.

## 3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term <u>average</u> period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any

50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

## 3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

The discharge-frequency relationship for the streams studied in detail was determined using USGS regression equations (Reference 6). Discharges were also computed using USGS methods that include the effect of urbanization along the streams (Reference 7). The larger of the two sets of values was used in the hydrologic analysis.

Peak discharge-drainage area relationships for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (SQ MILES) | PEAK DISCHARGE (CFS) 10-YEAR | 50-YEAR | 100-YEAR | 500-YEAR |
|---|---|---|---|---|---|
| HITCHCOCK CREEK | | | | | |
| about 3,900 feet downstream of Midway Pond Dam | 133.3 | 7,950 | 11,550 | 12,580 | 17,180 |
| just downstream of confluence of Falling Creek | 128.9 | 7,730 | 11,270 | 12,300 | 16,840 |
| just upstream of confluence of Falling Creek | 103.9 | 5,730 | 8,790 | 9,780 | 13,920 |
| at Steele Street | 100.5 | 5,390 | 8,360 | 9,340 | 13,400 |
| FALLING CREEK | | | | | |
| at mouth | 25.0 | 3,670 | 5,530 | 6,180 | 8,500 |
| NORTH PRONG FALLING CREEK | | | | | |
| at mouth | 12.7 | 1,900 | 3,150 | 3,660 | 5,380 |
| just downstream of Hinson Lake Dam | 11.6 | 1,660 | 2,810 | 3,300 | 4,940 |

TABLE 1 - SUMMARY OF DISCHARGES (Continued)

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (SQ MILES) | PEAK DISCHARGE (CFS) 10-YEAR | 50-YEAR | 100-YEAR | 500-YEAR |
|---|---|---|---|---|---|
| SOUTH PRONG FALLING CREEK | | | | | |
| at mouth | 11.8 | 2,480 | 3,840 | 4,350 | 6,060 |
| about 3,800 feet downstream of U.S. Route 74 | 5.3 | 1,640 | 2,600 | 3,000 | 4,230 |
| at Richmond College Lake Dam | 2.0 | 800 | 1,380 | 1,660 | 2,460 |

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

For the streams studied, cross-section data, elevation data, and structural geometry of bridges, culverts, and dams were obtained from field surveys.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

Starting water-surface elevations for the studied streams were determined using the slope-area method. Roughness coefficients (Manning's "n") were estimated from field inspection and aerial photography. Coefficients in the study area average approximately 0.05 for the channel and range from 0.04 to 0.12 for the overbank areas.

Water-surface profiles were determined using the HEC-2 step-backwater computer program (Reference 8).

The approximate 100-year floodplains, except those for the Pee Dee River, were determined using a USGS technique for estimating the flood heights for nontidal streams in North Carolina (Reference 9). An approximate floodplain for the Pee Dee River was determined based on data from the USGS gage at U.S. Route 74.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 50- and 100-year flood elevations are close together, due to limitations of the profile scale, only the 100-year profile has been shown.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the NGVD. Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

## 4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

### 4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps and topographic overlays at a scale of 1:4800 with a contour interval of 4 feet (Reference 10).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE) and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map. For streams studied by approximate methods within the City of Hamlet, the 100-year floodplain boundary was delineated using the Flood Insurance Rate Map for the City of Hamlet (Reference 1). Some delineations were determined using topographic maps at a scale of 1:24000 enlarged to a scale of 1:12000, with a contour interval of 10 feet (Reference 11).

### 4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management.

Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways for this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 2, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map. In cases where the floodway and 100-year floodplain boundaries are either close together or coilinear, only the floodway boundary is shown.

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than a 1.0-foot increase in the base flood elevations at any point within the community.

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

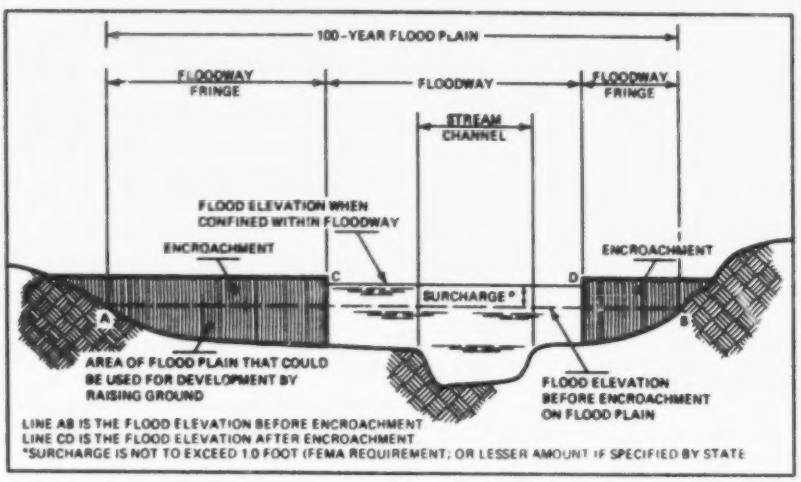

100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT; OR LESSER AMOUNT IF SPECIFIED BY STATE

FIGURE 2 - Floodway Schematic

| FLOODING SOURCE | | FLOODWAY | | | BASE FLOOD WATER SURFACE ELEVATION | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQ. FEET) | MEAN VELOCITY (FEET/SEC.) | REGULATORY (FEET NGVD) | WITHOUT FLOODWAY (FEET NGVD) | WITH FLOODWAY (FEET NGVD) | INCREASE (FEET) |
| HITCHCOCK CREEK | | | | | | | | |
| A | 22,700 | 500 | 3126 | 4.0 | 151.1 | 151.1 | 151.7 | 0.6 |
| B | 25,075 | 575 | 4629 | 2.7 | 156.9 | 156.9 | 157.8 | 0.9 |
| C | 25,900 | 260 | 2745 | 4.5 | 158.2 | 158.2 | 159.2 | 1.0 |
| D | 26,883 | 205 | 1741 | 7.1 | 165.3 | 165.3 | 165.3 | 0.0 |
| E | 27,490 | 360 | 4249 | 2.9 | 168.3 | 168.3 | 168.4 | 0.1 |
| F | 29,460 | 420 | 4725 | 2.6 | 169.4 | 169.4 | 169.7 | 0.3 |
| G | 31,770 | 620 | 6948 | 1.8 | 171.9 | 171.9 | 172.3 | 0.4 |
| H | 32,730 | 250 | 3203 | 3.1 | 172.4 | 172.4 | 173.1 | 0.7 |
| I | 35,160 | 185 | 2484 | 3.9 | 174.4 | 174.4 | 175.0 | 0.6 |
| J | 35,644 | 120 | 2051 | 4.8 | 175.0 | 175.0 | 175.6 | 0.6 |
| K | 36,630 | 197 | 3108 | 3.0 | 175.9 | 175.9 | 176.6 | 0.7 |
| L | 38,296 | 350 | 4591 | 2.0 | 176.8 | 176.8 | 177.6 | 0.8 |
| NORTH PRONG FALLING CREEK | | | | | | | | |
| A | 170 | 230 | 1325 | 2.8 | 211.6 | 211.5[2] | 212.5 | 1.0 |
| B | 550 | 230 | 1561 | 2.3 | 212.7 | 212.3[2] | 213.1 | 0.8 |
| C | 1970 | 128 | 941 | 3.7 | 215.6 | 213.1[2] | 214.1 | 1.0 |
| D | 2450 | 175 | 983 | 3.5 | 215.6 | 214.4[2] | 215.0 | 0.6 |
| E | 2735 | 200 | 1890 | 1.8 | 215.6 | 214.9[2] | 215.7 | 0.8 |
| F | 3425 | 185 | 2216 | 1.6 | 217.6 | 217.6 | 218.4 | 0.8 |
| G | 3926 | 190 | 1546 | 2.2 | 217.7 | 217.7 | 218.6 | 0.9 |
| H | 5570 | 220 | 2119 | 1.6 | 220.9 | 220.9 | 221.6 | 0.7 |
| I | 6268 | 185 | 1367 | 2.4 | 222.3 | 222.3 | 222.9 | 0.6 |
| J | 6750 | 340 | 2711 | 1.2 | 222.8 | 222.8 | 223.5 | 0.7 |
| K | 7345 | 540 | 3842 | 0.9 | 223.0 | 223.0 | 223.7 | 0.7 |

[1]FEET ABOVE MOUTH
[2]ELEVATIONS WITHOUT CONSIDERING OVERFLOW EFFECT FROM SOUTH PROMG FALLING CREEK

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RICHMOND COUNTY, NC AND INCORPORATED AREAS**

FLOODWAY DATA

**HITCHCOCK CREEK-NORTH PRONG FALLING CREEK**

| CROSS SECTION | DISTANCE[1] | FLOODWAY WIDTH (FEET) | FLOODWAY SECTION AREA (SQ FEET) | FLOODWAY MEAN VELOCITY (FT/SEC) | BASE FLOOD WATER SURFACE ELEVATION REGULATORY | WITHOUT FLOODWAY (FEET NGVD) | WITH FLOODWAY (FEET NGVD) | INCREASE |
|---|---|---|---|---|---|---|---|---|
| FALLING CREEK | | | | | | | | |
| A | 1212 | 70 | 600 | 10.3 | 194.4 | 194.4 | 195.0 | 0.6 |
| B | 1562 | 80 | 656 | 9.4 | 200.5 | 200.5 | 200.5 | 0.0 |
| C | 1960 | 110 | 1523 | 4.1 | 206.7 | 206.7 | 207.3 | 0.6 |
| D | 2570 | 170 | 1656 | 3.7 | 207.9 | 207.9 | 208.6 | 0.7 |
| E | 3715 | 150 | 1492 | 4.1 | 209.1 | 209.1 | 209.9 | 0.8 |
| F | 3785 | 165 | 1407 | 4.4 | 209.3 | 209.3 | 210.0 | 0.7 |
| G | 4950 | 120 | 1366 | 4.5 | 210.6 | 210.6 | 211.4 | 0.8 |
| H | 5095 | 180 | 2221 | 2.8 | 211.5 | 211.5 | 212.4 | 0.9 |
| SOUTH PRONG FALLING CREEK | | | | | | | | |
| I | 6400 | 220 | 1493 | 2.9 | 215.6 | 215.6 | 216.3 | 0.7 |
| J | 7250 | 200 | 2536 | 1.7 | 220.0 | 220.0 | 220.3 | 0.3 |
| K | 8950 | 300 | 2757 | 1.6 | 220.3 | 220.3 | 221.0 | 0.7 |
| L | 10900 | 335 | 2205 | 2.0 | 221.9 | 221.9 | 222.9 | 1.0 |
| M | 11694 | 335 | 2361 | 1.8 | 223.1 | 223.1 | 224.1 | 1.0 |
| N | 14150 | 390 | 2701 | 1.6 | 230.0 | 230.0 | 230.7 | 0.7 |
| O | 16150 | 360 | 2212 | 1.9 | 232.9 | 232.9 | 233.7 | 0.8 |
| P | 18150 | 420 | 2851 | 1.4 | 234.6 | 234.6 | 235.3 | 0.7 |
| Q | 20330 | 360 | 1431 | 2.4 | 237.2 | 237.2 | 237.8 | 0.6 |
| R | 24150 | 320 | 1467 | 2.0 | 247.3 | 247.3 | 248.0 | 0.7 |
| S | 27100 | 310 | 850 | 2.9 | 254.5 | 254.5 | 255.1 | 0.6 |
| T | 27900 | 310 | 1223 | 2.0 | 258.0 | 258.0 | 258.6 | 0.6 |
| U | 28907 | 300 | 1746 | 1.4 | 262.6 | 262.6 | 263.2 | 0.6 |
| V | 29995 | 300 | 1336 | 1.2 | 263.6 | 263.6 | 264.3 | 0.7 |

[1]FEET ABOVE MOUTH

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RICHMOND COUNTY, NC AND INCORPORATED AREAS**

FLOODWAY DATA

**FALLING CREEK-SOUTH PRONG FALLING CREEK**

## 5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

## 6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The current Flood Insurance Rate Map presents flooding information for the geographic area of Richmond County. Previously, separate Flood Hazard Boundary Maps and/or Flood Insurance Rate Maps were prepared for each flood-prone incorporated community and the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in Table 3, Community Map History.

| COMMUNITY NAME | INITIAL IDENTIFICATION | FLOOD HAZARD BOUNDARY MAP REVISIONS DATE | FIRM EFFECTIVE DATE | FIRM REVISIONS DATE |
|---|---|---|---|---|
| HAMLET, CITY OF | JULY 2, 1976 | | JULY 2, 1987 | |
| ROCKINGHAM, CITY OF | JUNE 11, 1976 | | SEPTEMBER 6, 1989 | |
| UNINCORPORATED AREAS | JULY 28, 1978 | MARCH 11, 1983 | SEPTEMBER 6, 1989 | |

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RICHMOND COUNTY, NC AND INCORPORATED AREAS**

**COMMUNITY MAP HISTORY**

## 7.0 OTHER STUDIES

The Flood Insurance Study in progress for Moore County, North Carolina (Reference 12) is in agreement with this study.

The Flood Insurance Studies for Scotland, Stanly, and Montgomery Counties, North Carolina (References 13-15) are in agreement with this study.

This Flood Insurance Study supersedes the previously printed Flood Insurance Rate Map for the City of Hamlet (Reference 1) and the Flood Hazard Boundary Maps for Richmond County and the City of Rockingham (References 16 and 17).

## 8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 1371 Peachtree Street, NE., Suite 736, Atlanta, Georgia 30309.

## 9.0 REFERENCES AND BIBLIOGRAPHY


1. Federal Emergency Management Agency, Flood Insurance Rate Map, City of Hamlet, Richmond County, North Carolina, July 1987.

2. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, North Carolina, Washington, D.C., February 1982.

3. U.S. Department of Agriculture, Soil Conservation Service, Preliminary Draft of General Soil Map of Richmond County, North Carolina, undated.

4. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Services, Climatological Data for North Carolina, Annual Summary, Asheville, North Carolina, 1983.

5. U.S. Geological Survey, Floods in North Carolina, Magnitude and Frequency, William E. Forrest and Paul R. Speer, 1961.

6. ————, Magnitude and Frequency of Floods in North Carolina, March 1976.

7. ----------, Effect of Urban Development on Floods in the Piedmont Province of North Carolina, Arthur L. Putnam, 1972.

8. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Computer Program 723-X6-L202A, Davis, California, April 1984.

9. U.S. Geological Survey, A Technique for Estimating Heights Reached by the 100-year Flood on Unregulated, Nontidal Streams in North Carolina, July 1979.

10. Air Survey Corporation, Aerial Photogrammetry, Scale 1:4800, Contour Interval 4 Feet: Rockingham, North Carolina, February 1987.

11. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 10 Feet: Ansonville, North Carolina, 1956; Diggs, North Carolina-South Carolina, 1971; Ellerbe, North Carolina, 1956; Ghio, North Carolina-South Carolina, 1949, photorevised 1982; Gibson, North Carolina-South Carolina, 1949; Harrisville, North Carolina, 1956; Hamlet, North Carolina, 1957, photorevised 1982; Hoffman, North Carolina, 1949; Lilesville, North Carolina, 1956; Mangum, North Carolina, 1956; Marston, North Carolina, 1949; Millstone Lake, North Carolina, 1949; Morven East, North Carolina-South Carolina, 1971; Mount Gilead East, North Carolina, 1956; Mount Gilead West, North Carolina, 1956; Norman, North Carolina, 1950, photorevised 1983; Pinebluff, North Carolina, 1948; Rockingham, North Carolina, 1956, photorevised 1982; Westend, North Carolina, 1949.

12. Federal Emergency Management Agency, Flood Insurance Study, Moore County, Unincorporated Areas, North Carolina, in progress.

13. ————, Flood Insurance Study, Scotland County, Unincorporated Areas, North Carolina, December 1988.

14. ————, Flood Insurance Study, Stanly County, Unincorporated Areas, North Carolina, December 1981.

15. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Montgomery County, Unincorporated Areas, North Carolina, October 1979.

16. ————, Federal Insurance Administration, Flood Hazard Boundary Map, Richmond County, Unincorporated Areas, North Carolina, July 1978.

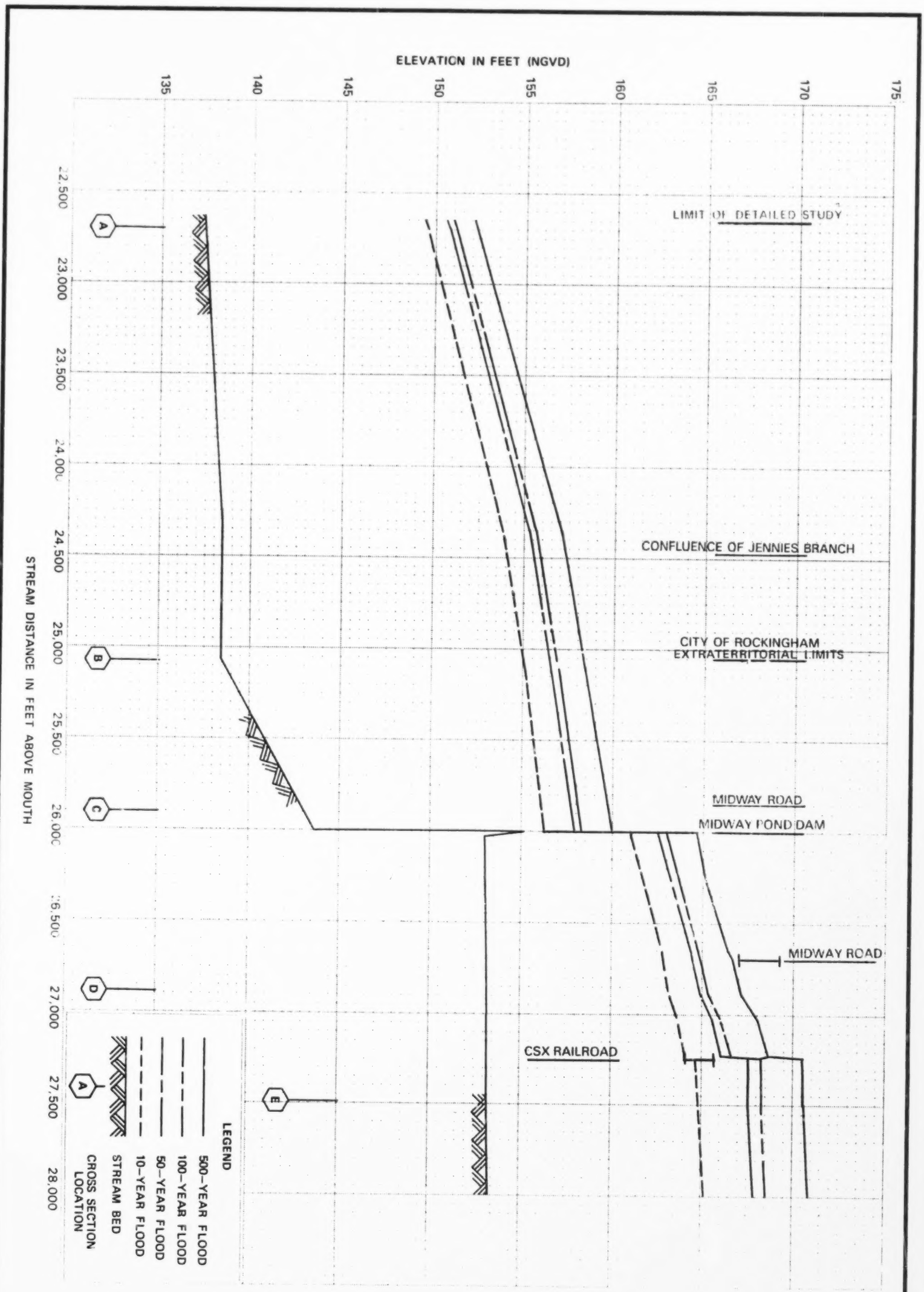
17. ————, Federal Insurance Administration, Flood Hazard Boundary Map, City of Rockingham, Richmond County, North Carolina, June 1976.

## ELEVATION REFERENCE MARKS

| REFERENCE MARK | FLOOD INSURANCE RATE MAP PANEL | ELEVATION (FEET NGVD) | DESCRIPTION OF LOCATION |
|---|---|---|---|
| 1 | 0025 | 207.76 | tablet stamped "50 WSM 1954 208" in southeast abutment of State Road 73 bridge over the Little River |
| 2 | 0050 | 544.38 | tablet stamped "TT 11HF 1949 544" set in concrete post located two miles north of City of Ellerbe along U.S. Route 220, about 27 feet east of center of roadway |
| 3 | 0075 | 319.19 | tablet stamped "114 WSM 1949 319" set in northwest abutment of SR 1003 bridge over Naked Creek, 5.2 miles southeast of City of Derby |
| 4 | 0095 | 170.80 | chiseled square on left downstream side of Steele Street bridge over Hitchcock Creek |
| 5 | 0100 | 193.62 | tablet stamped "55 WSM 1954 1940" in vertical face of rock ledge 30 feet north of SR 1148, located about 270 feet west of SR 1148 bridge over Mountain Creek, 5 feet above roadway |
| 6 | 0125 | 238.26 | chiseled square on northeast abutment of SR 1442 bridge over Ledbetter Lake, located about 0.47 mile southwest of intersection of SR 1442 and SR 1489 |
| 7 | 0150 | 430.54 | disk stamped "K 219 1980" located 0.9 mile northeast of intersection of SR 1004 and U.S. Route 1 along U.S. Route 1, about 62 feet southwest of pine tree |
| 8 | 0160 | 242.72 | railroad spike at centerline of CSX railroad tracks and centerline of Long Drive |
| 9 | 0175 | 180.00 | disk stamped "24 HLZ 1970" located 106 feet northeast of intersection of SR 2001 and SR 1971 |

## ELEVATION REFERENCE MARKS (Continued)

| REFERENCE MARK | FLOOD INSURANCE RATE MAP PANEL | ELEVATION (FEET NGVD) | DESCRIPTION OF LOCATION |
|---|---|---|---|
| 10 | 0180 | 265.97 | railroad spike in centerline of SR 1641 at edge of westbound lane of U.S. Route 74 |
| 11 | 0200 | 263.50 | disk stamped "RIC 1 1978" set in end of southwest headwall of concrete box culvert for Joe's Creek under U.S. Route 74 |

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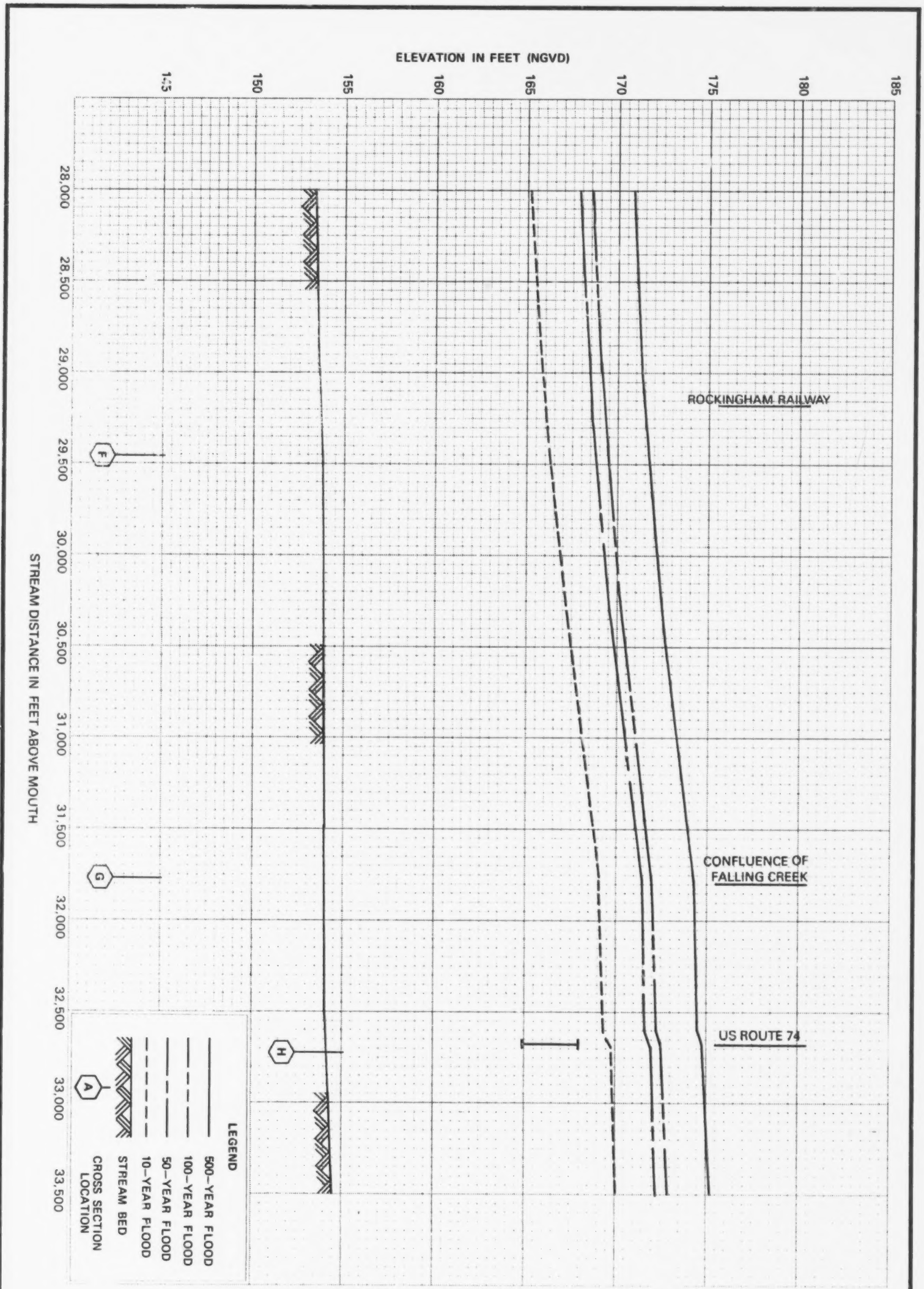
| 01P | FEDERAL EMERGENCY MANAGEMENT AGENCY<br>**RICHMOND COUNTY, NC<br>AND INCORPORATED AREAS** | **FLOOD PROFILES**<br>**HITCHCOCK CREEK** |
|---|---|---|



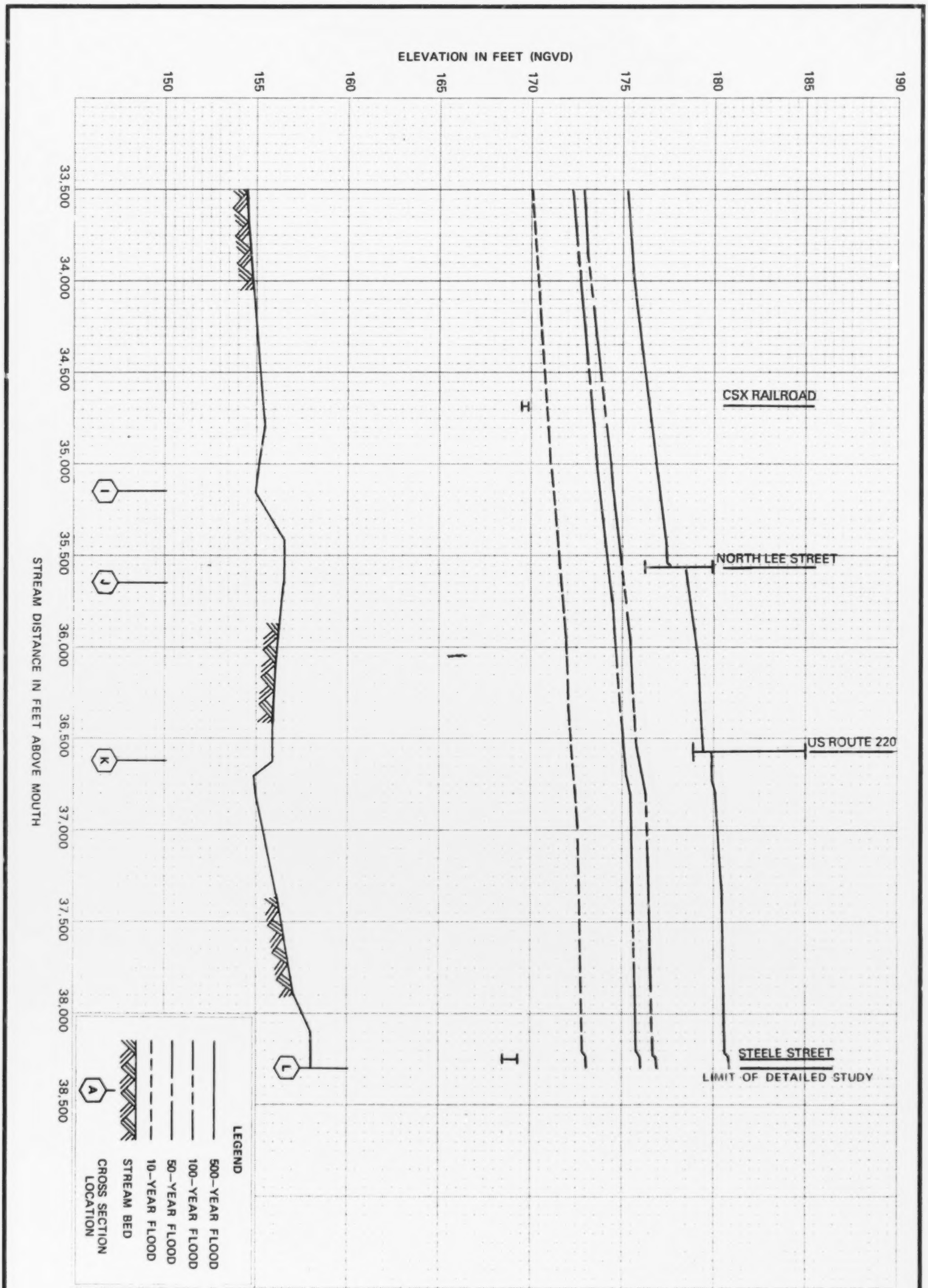

02P

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RICHMOND COUNTY, NC AND INCORPORATED AREAS**

**FLOOD PROFILES**

**HITCHCOCK CREEK**




| | | |
|---|---|---|
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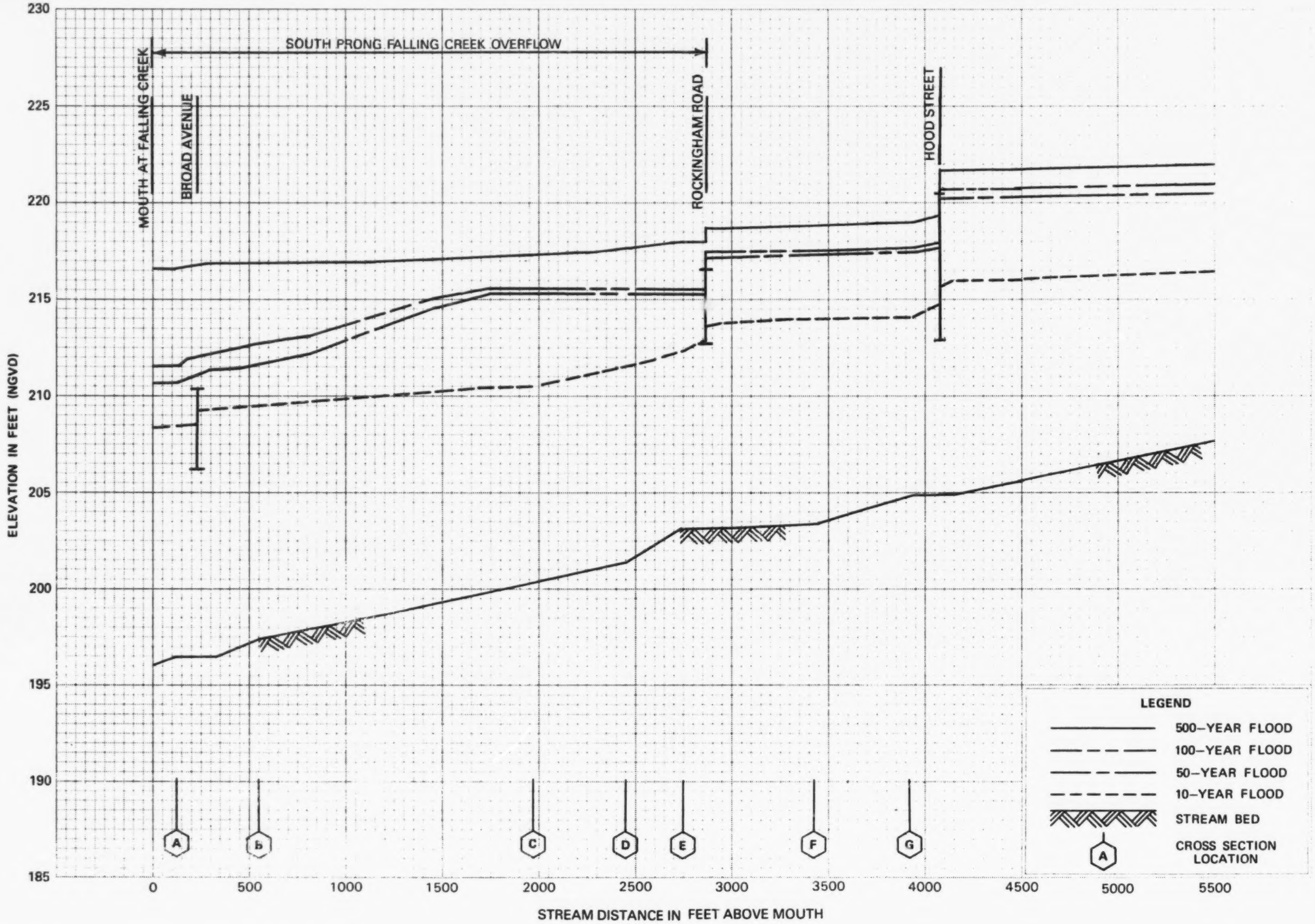


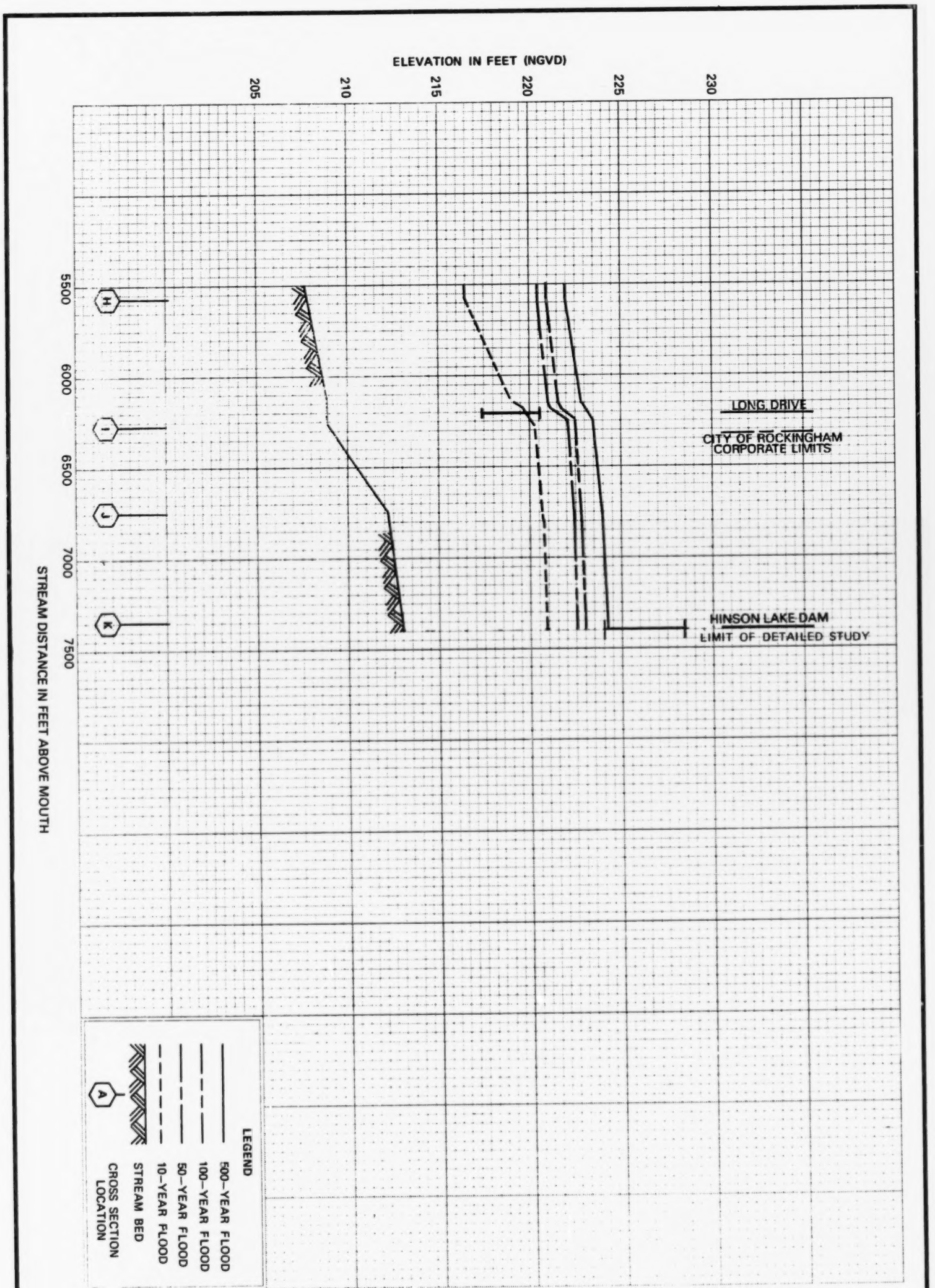

FLOOD PROFILES

NORTH PRONG FALLING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RICHMOND COUNTY, NC
AND INCORPORATED AREAS

04P

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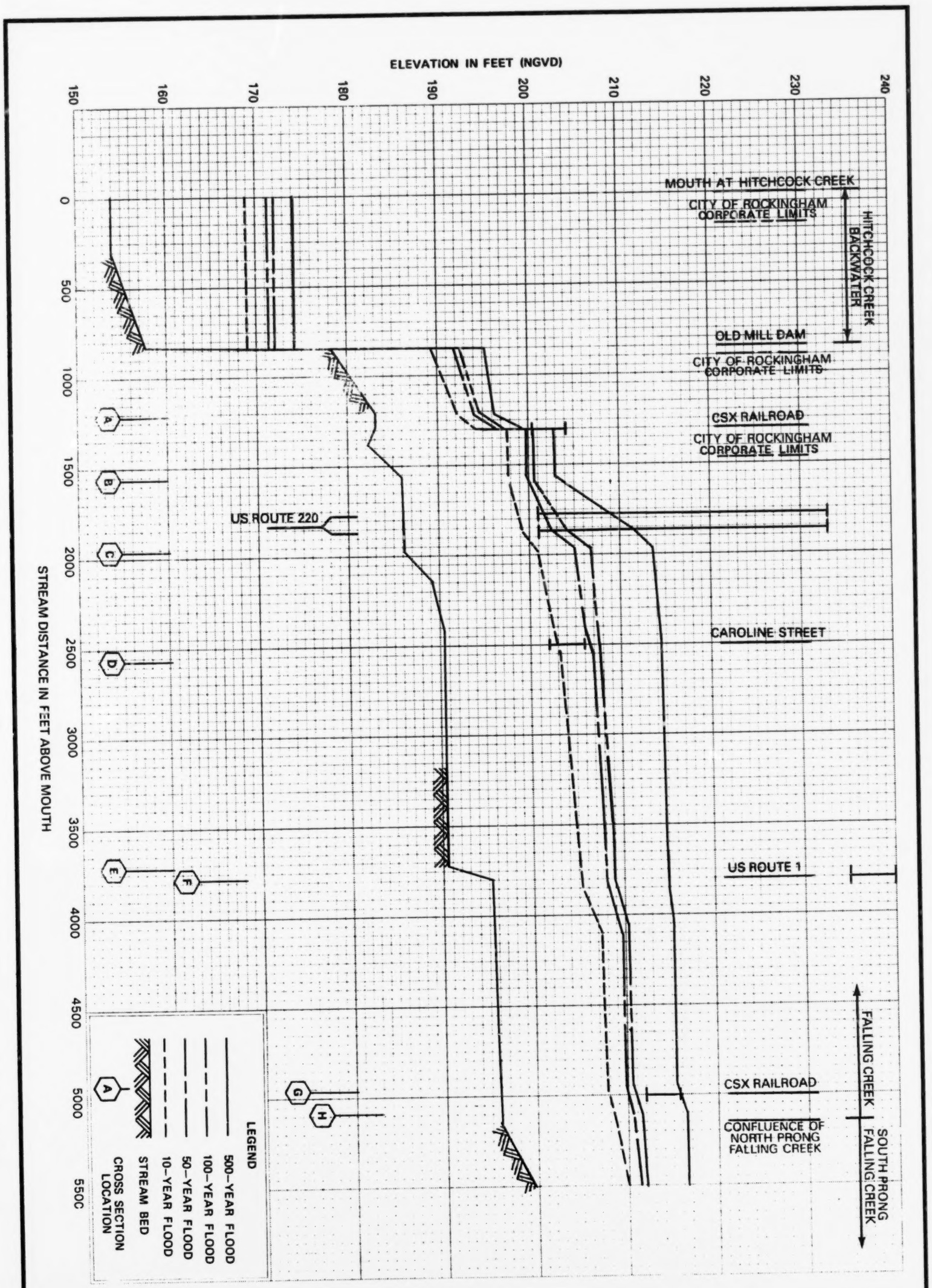
|---|---|---|



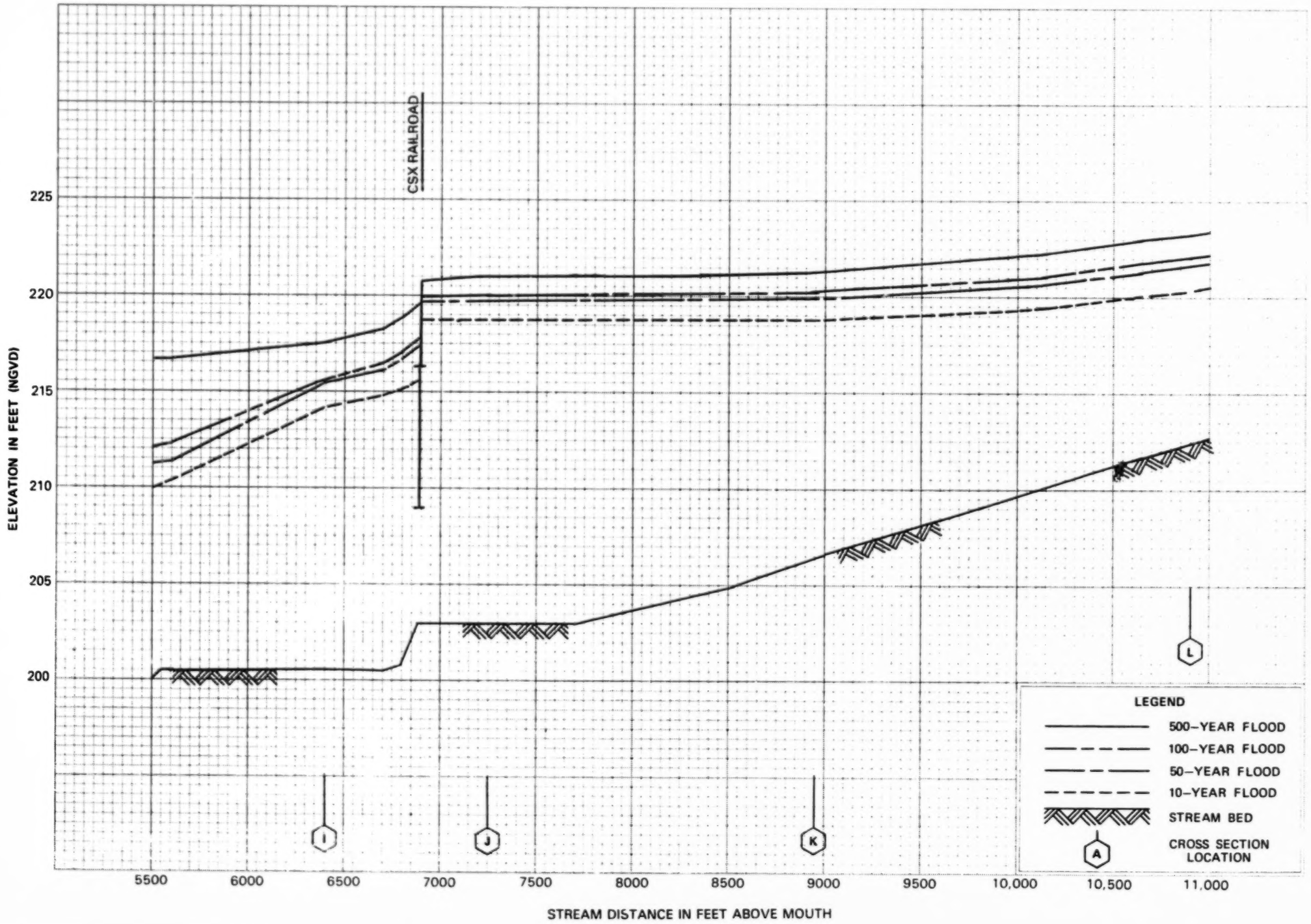

06P

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RICHMOND COUNTY, NC AND INCORPORATED AREAS**

**FLOOD PROFILES**

**FALLING CREEK-SOUTH PRONG FALLING CREEK**



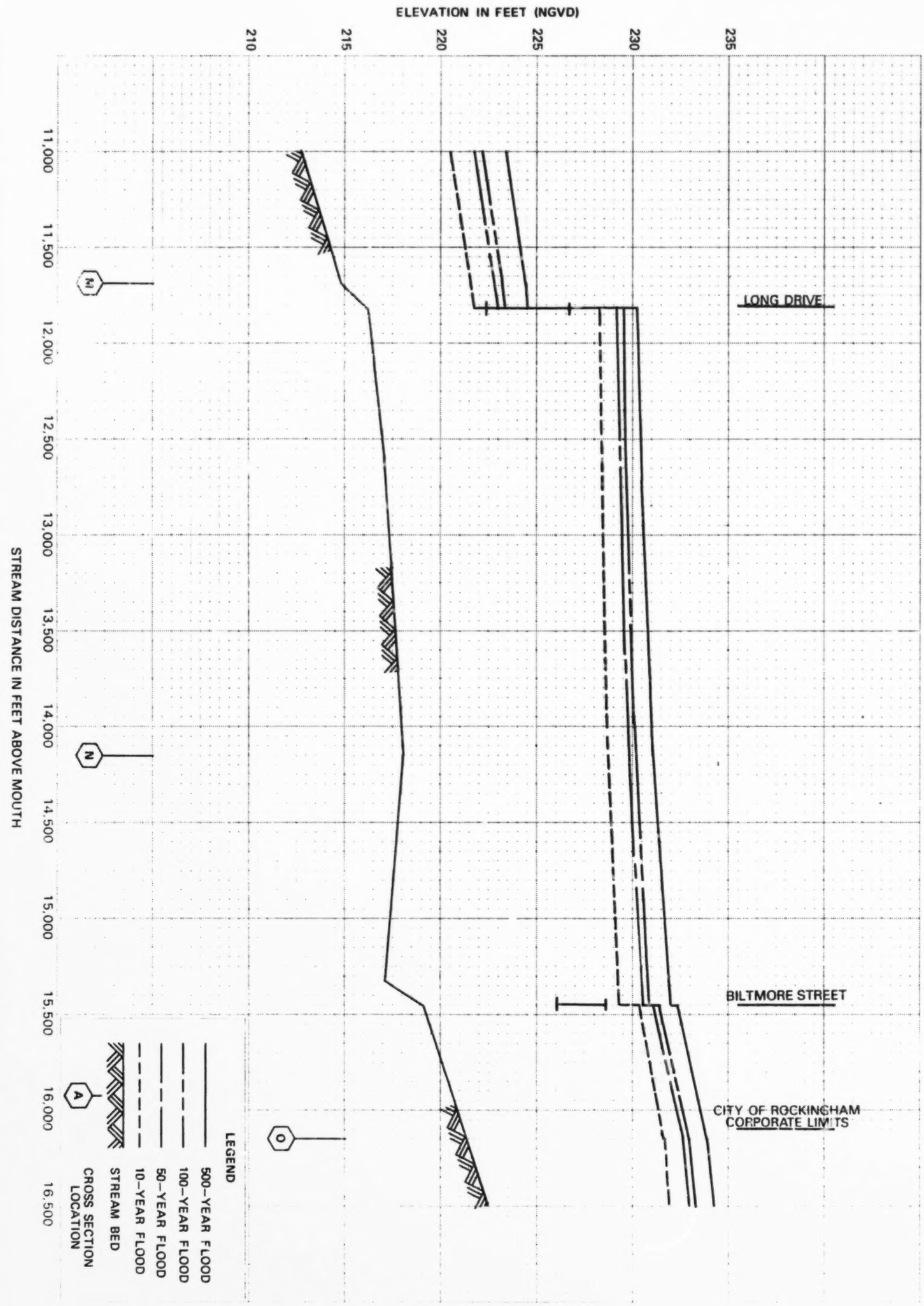

FLOOD PROFILES

SOUTH PRONG FALLING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RICHMOND COUNTY, NC
AND INCORPORATED AREAS

07P

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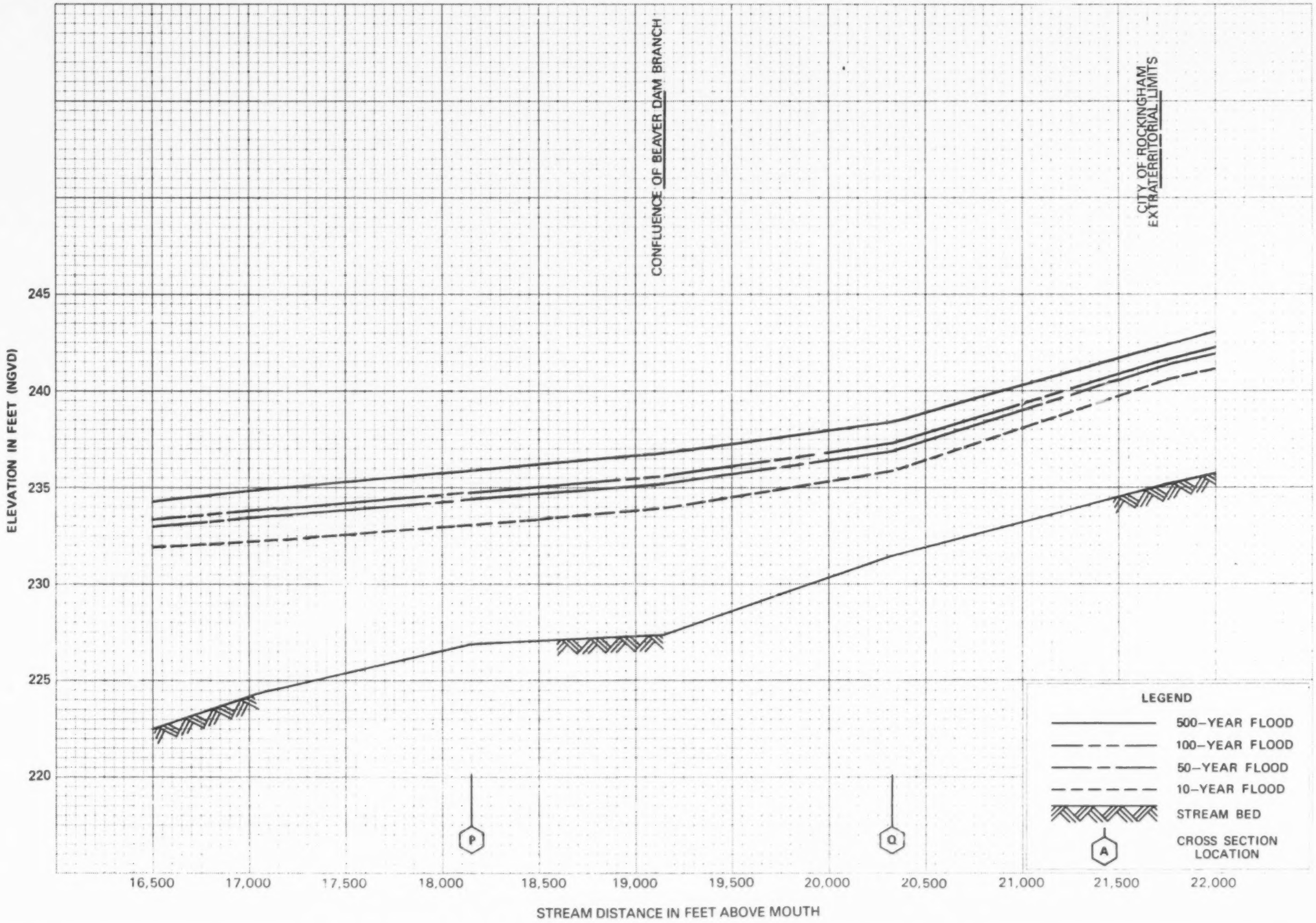
| 08P | FEDERAL EMERGENCY MANAGEMENT AGENCY<br>**RICHMOND COUNTY, NC<br>AND INCORPORATED AREAS** | **FLOOD PROFILES**<br>**SOUTH PRONG FALLING CREEK** |
|---|---|---|



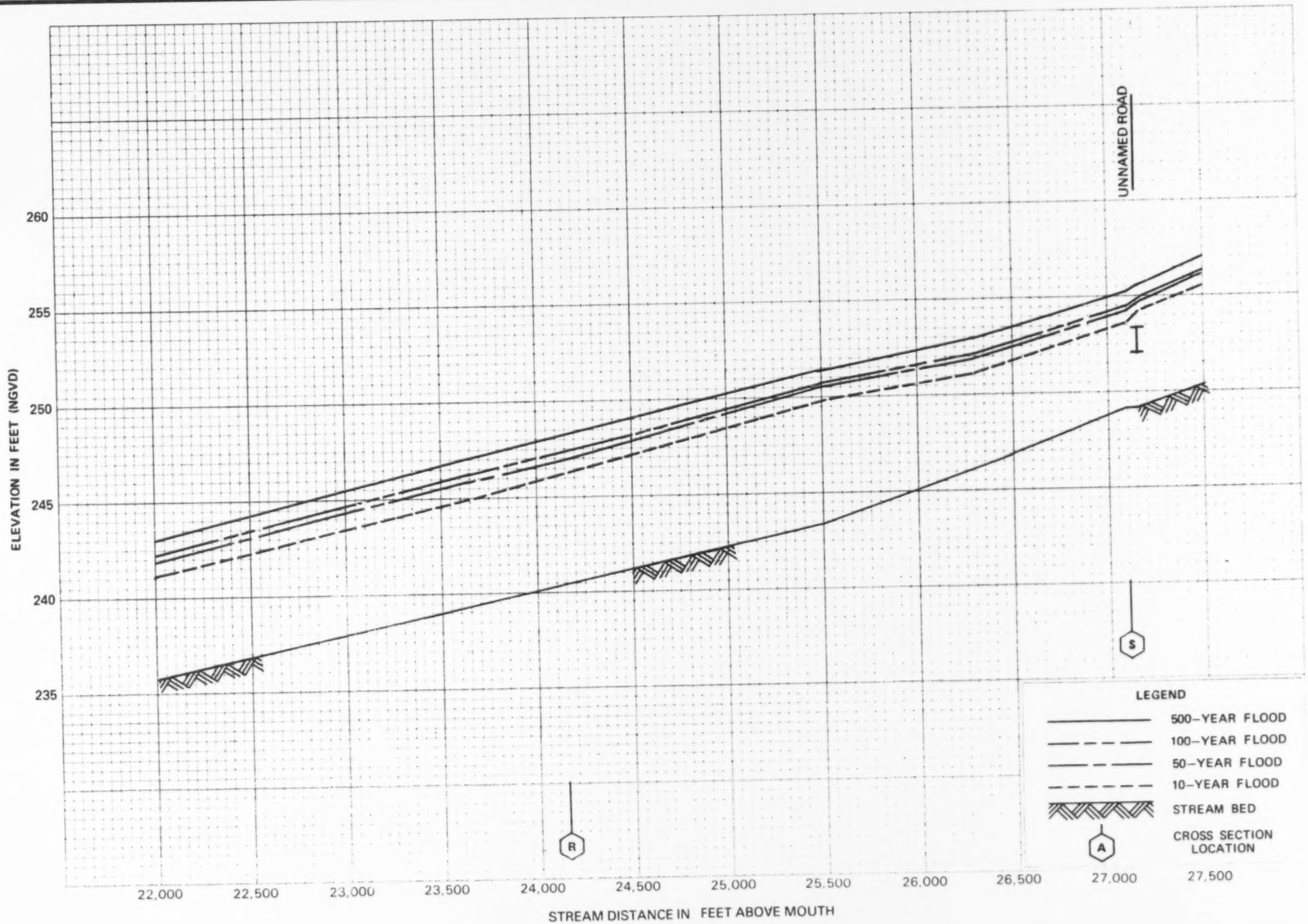

**FLOOD PROFILES**

**SOUTH PRONG FALLING CREEK**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RICHMOND COUNTY, NC**
**AND INCORPORATED AREAS**

**09P**



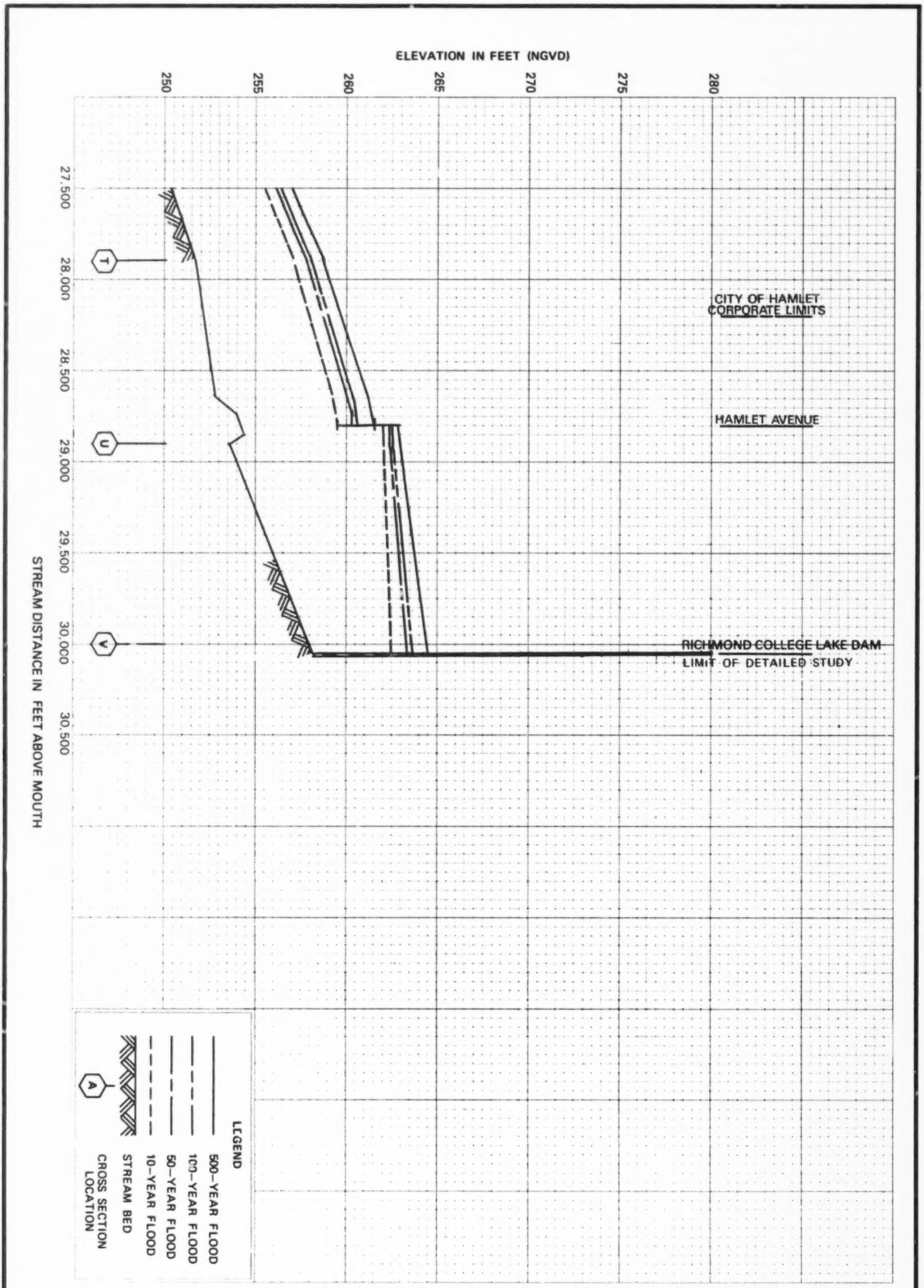

FLOOD PROFILES

SOUTH PRONG FALLING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RICHMOND COUNTY, NC
AND INCORPORATED AREAS

10P

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| 11P | FEDERAL EMERGENCY MANAGEMENT AGENCY<br>RICHMOND COUNTY, NC<br>AND INCORPORATED AREAS | FLOOD PROFILES<br>SOUTH PRONG FALLING CREEK |
|---|---|---|